

REMARKS

By this reply, Claims 1, 5, 7, 8, 12 and 13 have been amended, and new Claims 25-30 have been added, leaving Claims 1-30 pending in the application. It is respectfully submitted that the claim amendments do not raise the issue of new matter or raise any new issue that would require further search and/or consideration. The amendments also place the application in better condition for appeal. Therefore, the amendments should be entered. Reconsideration and allowance are respectfully requested in light of the following remarks.

Personal Interview

Applicants thank Examiner Dhingra and Supervisory Examiner Hassanzadeh for the courtesies they extended to their undersigned representative during the personal interview held on November 15, 2005. Applicants separate record of the substance of the interview is contained in the following remarks.

Restriction Requirement

For the reasons that were discussed in the Amendment filed on July 27, 2005, according to the provisions of M.P.E.P. § 821.04, once Claim 1 and/or Claim 8 is found allowable, then withdrawn Claim 12 and/or Claim 17 (and all claims dependent from these withdrawn claims) should be rejoined with the elected subject matter.

Objections to Claims

Claims 1 and 8 have been amended to address the Examiner's objections stated on page 2 of the Official Action. Withdrawal of the objections is respectfully requested.

First Rejection Under 35 U.S.C. § 103

Claims 1-6, 21 and 22 stand rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 6,320,736 to Shamouilian et al. ("Shamoulian") in view of U.S. Patent No. 6,015,595 to Felts ("Felts"). The reasons for the rejection are stated on pages 3-6 of the Official Action. The rejection is respectfully traversed.

Claim 1 has been amended to incorporate some of the features recited in Claim 7. Claim 7 has been amended to be consistent with amended Claim 1.

Claim 1, as amended, recites a multiple zone gas distribution apparatus comprising, *inter alia*, the features of "inner and outer zone bleed lines connected to the respective inner and outer zone feed lines between the pressure and flow control system and the chuck, the inner zone bleed line having a connecting line in fluid connection with the outer zone bleed line and a fixed orifice adapted to continuously bleed the pressure of the inner zone during processing of the workpiece, the inner zone bleed line having an evacuation valve which is adapted to bypass the fixed orifice for immediate inner zone evacuation, and the outer zone bleed line having a evacuation valve for pressure release" (emphasis added). Applicants submit that the applied combination of references fails to suggest the subject matter recited in Claim 1.

At page 6, lines 12-14, of the Official Action, the Examiner acknowledges that Shamouillan in view of Felts “do not teach that inner zone bleed line evacuation valve is adapted to by-pass the fixed orifice for immediate inner zone evacuation.” Accordingly, the combination of features recited in Claim 1 is patentable over the applied combination of references for at least this reason.

Claims 2-6, 21 and 22, which depend from Claim 1, are also patentable over the applied references for at least the same reasons as those for which Claim 1 is patentable. Withdrawal of the rejection is therefore respectfully requested.

Second Rejection Under 35 U.S.C. § 103

Claim 7 stands rejected under 35 U.S.C. § 103(a) over Shamouilian in view of Felts, and further in view of U.S. Patent No. 6,254,683 to Matsuda et al. (“Matsuda”). The reasons for the rejection are stated on pages 6-7 of the Official Action. The rejection is respectfully traversed.

As discussed above, Claim 1 recites the features of “inner and outer zone bleed lines connected to the respective inner and outer zone feed lines between the pressure and flow control system and the chuck, the inner zone bleed line having a connecting line in fluid connection with the outer zone bleed line and a fixed orifice adapted to continuously bleed the pressure of the inner zone during processing of the workpiece, the inner zone bleed line having an evacuation valve which is adapted to bypass the fixed orifice for immediate inner zone evacuation, and the outer zone bleed line having a evacuation valve for pressure release” (emphasis added). Although the Official Action acknowledges that Shamouilian and Felts fail to suggest the features of “the inner zone bleed line having an evacuation valve which

is adapted to bypass the fixed orifice for immediate inner zone evacuation," the Official Action contends that Matsuda cures the deficiencies of Shamouilian and Felts with respect to these features. Applicants respectfully disagree.

The gas distribution apparatus recited in Claim 1 comprises an inner zone bleed line having a connecting line in fluid connection with the outer zone bleed line and a fixed orifice. The fixed orifice is adapted to continuously bleed the pressure of the inner zone during processing of a workpiece. The fixed orifice can prevent excess pressure from the inner zone migrating to the outer zone, so that the outer zone pressure can be controlled. As recited in Claim 1, the inner zone bleed line has an evacuation valve adapted to bypass the fixed orifice for immediate inner zone evacuation. In the exemplary embodiment of the gas distribution apparatus shown in FIG. 1, the inner zone bleed line 52 includes a connecting line 68 in fluid connection with the outer zone bleed line 54 and a fixed orifice 60. An evacuation valve 66 is arranged along the inner zone bleed line 52. The fixed orifice 60 allows pressure in the inner zone to be continuously bled via the connecting line 68 during processing of a workpiece held on the chuck. The evacuation valve 66 allows the fixed orifice 60 to be bypassed for immediate inner zone evacuation.

Shamouilian discloses a chuck and a gas supply system for supplying heat transfer gas to a chuck. As shown in Fig. 5 of Shamouilian, the gas supply system includes a heat transfer gas source 59, a flow control system 55, and gas inlet lines 50a, 50b, which supply gas to inlet ports 40a, 40b. The gas supply system also includes a heat transfer gas exhaust 61. Heat transfer gas can be exhausted directly to the exhaust 61 via a conduit depicted in broken line in Fig. 5. Bypass valves 76a,

76b and valve 72 are in fluid connection with the gas inlet lines 50a, 50b. Valve 72 is normally closed. See column 7, lines 20-42, of Shamouilian.

The Official Action acknowledges that Shamouilian discloses a bypass valve 76b. See page 4, line 7, of the Official Action. Consistent with this acknowledgement, the Official Action states that Shamouilian does not suggest that the valve 76b is a fixed orifice, as recited in Claim 1. The Official Action states that Felts discloses a plasma apparatus including a valve that can be replaced with a fixed orifice to provide predetermined flow of process gas. Applicants note that Felts discloses that metering valves 49 and 61 can be replaced with fixed orifices to provide predetermined gas flows. See column 6, lines 3-8. The Official Action contends that it would have been obvious to replace Shamouilian's bypass valve 76b with Felts's fixed orifice to provide a predetermined flow of process gas.

However, Shamouilian's valve 72 is downstream from the bypass valve 76b and thus does not allow the bypass valve 76b to be bypassed. Moreover, the valve 72 is normally closed. As such, Shamouilian teaches away from continuously bleeding the conduit along which the bypass valve 76b is located.

Moreover, replacing Shamouilian's bypass valve 76b with Felts' fixed orifice would necessarily eliminate the bypass valve. Claim 1 recites an inner bleed line having a fixed orifice and an evacuation valve, which is adapted to bypass the fixed orifice for immediate inner zone evacuation.

Felt's optional fixed orifice is not arranged along a bleed line, and thus Felts fails to suggest that the fixed orifice is adapted to continuously bleed the pressure of an inner zone, as recited in Claim 1. As such, Felts does not suggest replacing Shamouilian's bypass valve 76b with the fixed orifice.

The Official Action asserts that Matsuda discloses an apparatus having an evacuation line 19 with a cut-off valve 41 and a by-pass line 17a with valve 43 to enable faster evacuation. However, Shamouilian's apparatus includes a bypass valve 76b along the "inner zone bleed line." Matsuda does not suggest modifying Shamouilian's apparatus to include an additional bypass line in the "inner zone bleed line." For at least the foregoing reasons, the applied combination of references does not suggest the combination of features recited in Claim 1. Thus, Claim 1 is patentable over the combination of references.

Claim 7, which depends from Claim 1, is also patentable over the applied combination of references for at least the same reasons as those for which Claim 1 is patentable. Therefore, withdrawal of the rejection is respectfully requested.

Third Rejection Under 35 U.S.C. § 103

Claims 8-11, 23 and 24 stand rejected under 35 U.S.C. § 103(a) over Shamouilian in view of Felts, and further in view of JP 10163308 ("JP '308"). The reasons for the rejection are stated on pages 7-8 of the Official Action. The rejection is respectfully traversed.

Claim 8, as amended, recites an apparatus for detecting dechucking in a multiple zone wafer cooling system, which comprises, *inter alia*, the features of "first and second zone bleed lines connected to the respective first and second zone feed lines between the pressure and flow control system and the chuck, the first zone bleed line having a connecting line in fluid connection with the second zone bleed line and a fixed orifice adapted to continuously bleed the pressure of the first zone during processing of the workpiece, the first zone bleed line having an evacuation

valve which is adapted to bypass the fixed orifice for immediate first zone evacuation” and “the pressure and flow control system provides a signal indicating dechucking when the flow rate increases more than a predetermined amount” (emphasis added). Claim 8 has been amended at several locations to change the inner and outer zones to the first and second zones to be consistent with the remainder of this claim, and with the claims which depend from Claim 8.

For reasons discussed above, Shamouilian and Felts fail to suggest at least the combination of features of “the first zone bleed line having a connecting line in fluid connection with the second zone bleed line and a fixed orifice adapted to continuously bleed the pressure of the first zone during processing of the workpiece, the first zone bleed line having an evacuation valve which is adapted to bypass the fixed orifice for immediate first zone evacuation.” Applicants submit that JP ‘308 also fails to suggest modifying Shamouilian’s apparatus to result in the combination of features recited in Claim 8. Thus, Claim 8 is patentable over the applied combination of references.

Claims 9-11, 23 and 24, which depend from Claim 8, are also patentable over the applied combination of references for at least the same reasons as those for which Claim 8 is patentable. Therefore, withdrawal of the rejection is respectfully requested.

New Claims

New dependent Claims 25-30 are also patentable.

Conclusion

For the foregoing reasons, allowance of the application is respectfully requested. If there are any questions concerning this response, to expedite prosecution, the Examiner is respectfully requested to contact the undersigned at the number given below.

Respectfully submitted,

BUCHANAN INGERSOLL PC (INCLUDING ATTORNEYS
FROM BURNS DOANE SWECKER & MATHIS)

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